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(54) Rodenticidal composition

(57) A rodenticidal composition comprises a toxicant and an emulsified fatty carrier. The carrier preferably comprises a mixture of water soluble fats or fatty oils, particularly a mixture of palm and soya oil. The toxicant may be for example coumarin derivatives, chlorinated hydrocarbons, heterocyclic derivatives or naturally occurring compounds.

The composition may be applied to non-horizontal and non-flat surfaces of

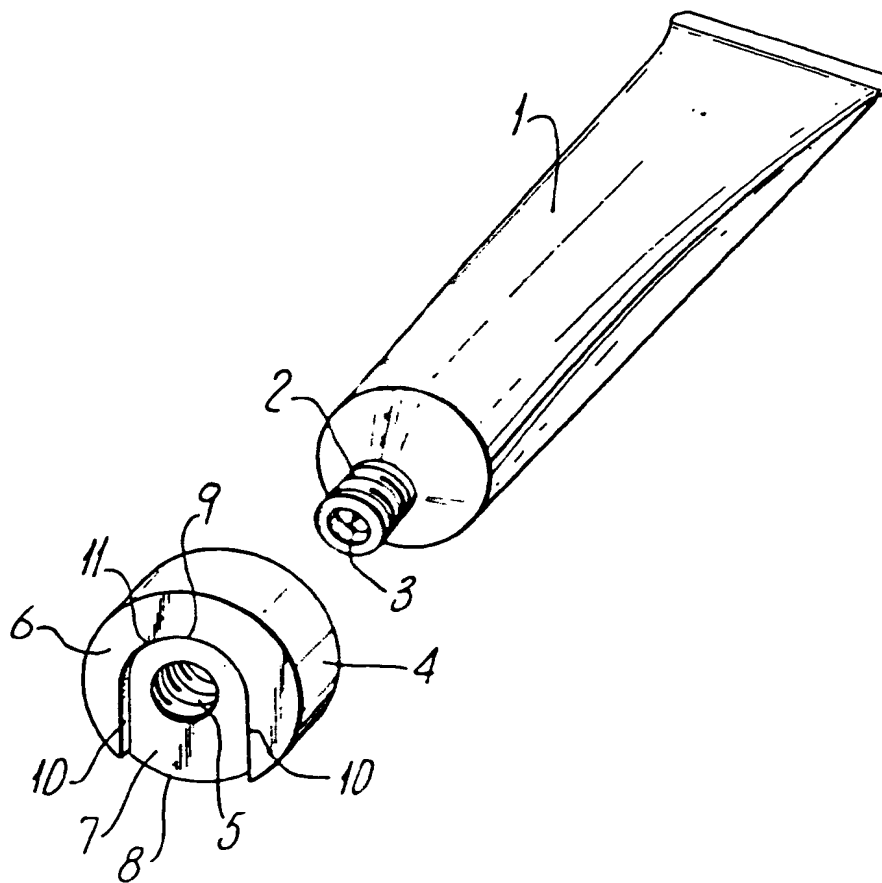
rodent runways, suitably on an adhesive tape set down on the surface to be treated.

The composition is preferably applied by an applicator which has a through bore connected at one end to the neck of a container and opening at the other end, to a recess extending to the periphery of the applicator. The recess has side walls such that, as the composition leaves the bore and the applicator is moved relative to the surface, the composition is applied in the form of a strip.

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SPECIFICATION

Rodenticidal composition

5 The present invention relates to a new composition for controlling rodents; and to a method and apparatus for applying same.

It is known to control the size of the rodent population by the use of rodenticides in a number of different formulations. For example the rodenticides may be mixed with solid food, such as oatmeal or wheat to form a poisoned bait. Alternatively the rodenticide may be mixed with a carrier dust, and placed in patches along a rodent runway. In this case the animal picks the dust up on its feet, tail and fur, from where the toxicant is ingested into the rodent's body when it grooms itself. A solid dye material may be added to the toxicant/carrier dust mixture so that the tracks of animals that have picked up the dust will clearly stand out against the background.

As an alternative to a visible dye a dye that absorbs in the UV region and fluoresces in the visible may be used, as outlined in UK Patent Application 2,002,634A.

25 There are numerous disadvantages in using formulations of the above mentioned type.

1. Such formulations cannot readily be placed on surfaces that are not substantially horizontal and flat. It follows that it is very difficult to place such pellet bait or contact dust along rodent runways that traverse for example vertical surfaces, pipes, ducts or chases.

2. Even if placed on substantially flat surfaces, dusts especially, tend to be blown from their original position by draughts or the wind.

3. The tendency of dusts to be blown from their original position leads to difficulties in their removal after use, and thereby, because of incomplete removal, to contamination of the environment.

40 It is the aim of the present invention to provide a rodenticidal composition which may readily be applied to non-horizontal surfaces and/or may subsequently be removed leaving minimal residual contamination.

45 According to the present invention there is provided a rodenticidal composition comprising a toxicant and an emulsified fatty carrier. The emulsified fatty carrier may comprise an emulsified mixture of one or more water insoluble fats or fatty oils of vegetable or animal origin such as those commercially available as edible spreads.

50 The fats or fatty oils are predominantly glyceryl esters of fatty acids, or triglycerides, as described in more detail in Kirk-Othmer, "Encyclopedia of Chemical Technology", 2nd Edn., 8th Volume, pp 776-811.

55 Preferably the fatty oils of this invention are vegetable oils, for example almond, apricot, kernal, corn, cottonseed, kapok, olive, palm, peanut, poppyseed, rice bran, safflower, sesame, soya, sunflower seed, or teaseed oil. The water emulsions may be stabilised by any of the emulsion stabilisers well known in the fat or fatty oil art. For example monoglycerides, mixtures of mono-, di- and triglycerides or phosphatides may be used.

65 Other conventional additives such as antioxidants

may be included. A particularly convenient carrier is an edible spread based on a mixture of palm and soya oil.

70 Preferably the mixture of fats or fatty oils comprises at least 25% by weight, especially 40-60%, of linoleic acid esters.

75 The toxicant of this invention may be any of the rodenticides that have found use in the rodenticidal art. For example coumarin derivatives, such as brodifacoum or difenacoum, chlorinated hydrocarbons, such as γ -hexachlorocyclohexane, complex heterocycles, such as norbromide, or naturally occurring compounds, such as calciferol (Vitamin D₂), have been used successfully in the rodenticidal composition of this invention.

80 The concentration of toxicant in the composition will depend upon the toxicant employed. Generally, in order to be effective against rodents, lower concentrations of coumarin or naturally occurring toxicants are required than their chlorinated hydrocarbon or complex heterocyclic counterparts. Typically coumarin or naturally occurring toxicants comprise less than about 2% (wt/wt) of the rodenticidal composition whilst chlorinated hydrocarbon or complex heterocyclic toxicants comprise between about 5 and 20% (wt/wt) of the composition.

85 In addition to the toxicant and fat or fatty oil, the rodenticidal composition of the present invention may additionally comprise one or more dye components that absorb either in the visible region of the electromagnetic spectrum or in the UV region, or both. Any of the dyes that have found use in the rodenticidal art may be chosen but a particularly preferred dye, which absorbs both in the visible and UV regions, is a red fluorescing melamine formaldehyde sulphonamide pigment, sold under the Trade Names "Fire Orange" or "Saturn Yellow" and as supplied by Messrs. Swada (London) Ltd in the "E" or "MF" series. Typically the dye may comprise between about 2 and 7%, preferably 3 and 5% (by weight) of the composition.

90 By using a dye, visible or UV absorbing or both, it is possible, by using the present composition, not only to kill the rodents that pick up the composition but also to identify the runways of the animals, as explained in UK Patent Application No. 2,002,634A.

95 In a further aspect of this invention of this invention there is provided a method for the control of rodent populations wherein the rodenticidal composition of the present invention is applied to the surface of known or suspected rodent runways or other areas to which rodents have access. In a preferred embodiment of the method of this invention a strip of adhesive tape or such like is applied, adhesive side down, to the surface and then the rodenticidal composition of the present invention is applied along the non-adhesive side of the tape. The advantage of using such tape over the direct application of the composition to the normal surface lies in the ease by which, after the rodent control treatment has ended, the rodenticidal composition may be removed simply by peeling the adhesive tape from the surface.

100 In further embodiments of the method of this invention either the rodenticidal composition of this

invention is applied to stiff paper, card or such material, which is then folded into a cone, half cone or similar shape and inserted into the mouth of a rodent's burrow or the composition is applied along the run-way portion of an ordinary bait container, the hopper of said container enclosing plain unpoisoned food such as wheat or oatmeal.

Generally the advantages of the composition of this invention and the methods of application thereof lies in the ability of the present composition to be applied to non-horizontal and flat surfaces, such as pipes, ducts, chases and walls, upon which it is difficult to place dusts or pellets. Further the present composition, once applied, will not fall off a surface or be blown from its original position so that it is easier, once used, to remove than dusts and pellets and is consequently less likely to contaminate the environment than these earlier rodenticides.

Rodents are generally killed by the composition of this invention in the same way as they are killed by contact rodenticidal preparations in dust form, that is as a result of grooming themselves. However it is an additional advantage of the present composition that rodents appear to favour fats or fatty oils, especially vegetable fats or oils, as food substances, and that therefore many of them ingest the toxicant not only during grooming but also during feeding.

The rodenticidal composition of the present invention may be applied to run-ways etc. by or from any suitable applicator, for example the composition may be applied by a spatula to the runway or may be squeezed from a tube, in a manner similar to the application of toothpaste to a brush, however a particularly suitable device for applying the rodenticidal composition of the present invention comprises an applicator having a through bore adapted to be connected at one end, either directly or indirectly, to a reservoir containing the rodenticidal composition and opening, at the other end, onto a recess of known depth extending to the periphery of the applicator, said recess having side walls which are so arranged that, as the composition leaves the bore and the applicator is moved relative to and in contact with the surface, the composition is applied in the form of a strip.

Preferably the reservoir is a flexible container of plastic or metal construction, with a threaded neck. In such a preferred embodiment, the bore of the applicator is also threaded allowing the applicator to be screwed onto the neck of the container. When not in use a suitable threaded cap may be screwed onto the container in place of the applicator.

The applicator, which preferably comprises either plastic or metal, may be of any convenient shape. In one preferred embodiment the applicator is cylindrical, with the bore, in a substantially central position, opening onto the two parallel flat surfaces of the cylinder. The recess, which is formed by moulding or by milling one of the parallel flat surfaces of the cylindrical applicator, may extend only from the bore to the periphery of the flat surface or it may extend from behind the bore to the periphery. It may even extend diametrically across the whole of one flat surface. It is preferred however that the recess extends to one side only of the periphery. The recess may be

of any suitable depth or width. In a preferred embodiment of the apparatus of this invention the dimensions of the recess are such that, in use when normal pressure is applied to the container, it produces a strip of rodenticidal composition of about 2cm. wide and 1mm deep.

Adhesive tape may be provided for use in conjunction with the applicator as outlined above.

The rodenticidal composition, the method of application of said composition and the apparatus for performing said method will now be described by way of Example only with particular reference to the Figure, wherein Figure 1 is a perspective view of one embodiment of the applicator and container of the apparatus of this invention.

Referring to the Figure a flexible plastic container 1, containing a rodenticidal composition of this invention, has a threaded neck 2 with an opening 3 through which the composition may be expelled. A plastic cylindrical applicator 4 has a threaded through bore 5, the thread of which compliments the thread of the container's neck. The bore 5 opens centrally onto the two parallel flat surfaces of the applicator 4. The surface adjacent the container is plane whilst the other 6 has a U shaped recess 7 of uniform depth that extends from the periphery 8 of the surface 6 to a position 9 behind the bore 5. The recess 7 is surrounded by parallel side walls 10 and arc shaped back wall 11.

In an alternative embodiment either or both the container 1 and the applicator 4 may be of metal construction. Further the neck 2 of the container 1 may be plane and compliment a plane through bore 5 in the applicator 4.

In use the applicator 4 is screwed onto the neck 2 of the container 1 with its recessed surface 6 facing away from the container 1. A strip of adhesive tape (not shown) is laid on the surface to be treated and then the container 1 is positioned perpendicular to the tape and surface such that the recessed surface 6 of the applicator 4 lies on the tape. The rodenticidal composition is then expelled from the opening 3 in the neck 2 of the container 1 and therefrom through the bore 5 of the applicator 4 by the application of pressure to the flexible container 1. As the composition is expelled the container 1 is moved along the tape ensuring that the periphery 8 of the recessed surface 6 forms the back edge of the applicator as it is moved, and that the container 1 is retained in a perpendicular relationship to the tape. In this way a strip of rodenticidal composition may be applied to the tape. The width and depth of the strip will depend on respectively the width and depth of the recess 7, the pressure applied to the container 1 and the speed with which the container 1 is moved along the tape. When the application of rodenticidal composition has been completed the applicator 4 may be screwed off the neck 2 of the container and be replaced by a threaded or plane cap (not shown) that also compliments the neck 2 of the container 1.

The following rodenticidal compositions were prepared by mixing the rodenticide and the sulphonamide pigment into the vegetable fat until the toxicant and pigment were each evenly distributed throughout the carrier.

Example 1 (% by weight)

0.05% Brodifacoum
96.95% Emulsified vegetable fat
3.00% Melamine formaldehyde sulphonamide pigment

Example 2

0.2% Difenacoum
96.8% Emulsified vegetable fat
3.0% Melamine formaldehyde sulphonamide pigment

Example 3

0.75% Calciferol
96.25% Emulsified vegetable fat
3.00% Melamine formaldehyde sulphonamide pigment

Example 4

10% Norbormide
87% Emulsified vegetable fat
3% Melamine formaldehyde sulphonamide pigment

Example 5

15% γ -hexachlorocyclohexane (Lindane, Trade Mark)
82% Emulsified vegetable fat
3% Melamine formaldehyde sulphonamide pigment

CLAIMS

1. A rodenticidal composition comprising a toxicant and an emulsified fatty carrier.
2. A rodenticidal composition according to claim 1 wherein the emulsified fatty carrier comprises an emulsified mixture of one or more water insoluble fats or fatty oils of vegetable or animal origin.
3. A rodenticidal composition according to claim 2 wherein the fatty oils are almond, apricot, kernal, corn, cottonseed, Kapok, olive, palm, peanut, poppyseed, rice bran, safflower, sesame, soya, sunflower seed or teaseed oil.
4. A rodenticidal composition according to either claim 2 or 3 wherein the emulsified fatty carrier comprises a mixture of palm and soya oil.
5. A rodenticidal composition according to any one of claims 2 to 4 wherein the mixture of fats or fatty oils comprises at least 25% by weight of linoleic acid esters.
6. A rodenticidal composition according to claim 5 wherein the mixture of fats or fatty oils comprises between 40 and 60% by weight of linoleic acid esters.
7. A rodenticidal composition according to any one of claims 1 to 6 wherein the emulsified fatty carrier is stabilised by an emulsion stabiliser.
8. A rodenticidal composition according to any one of claims 1 to 7 wherein the emulsified fatty carrier contains an antioxidant.
9. A rodenticidal composition according to any one of claims 1 to 8 wherein the toxicant is a coumarin derivative, a chlorinated hydrocarbon, a heterocyclic derivative or a naturally occurring compound.
10. A rodenticidal composition according to claim 9 wherein the toxicant is brodifacoum, difenacoum, γ -hexachlorocyclohexane, norbormide or calciferol.
11. A rodenticidal composition according to

either claim 9 or 10 wherein the composition contains about 2% (wt/wt) of a toxicant which is a coumarin derivative or a naturally occurring compound.

12. A rodenticidal composition according to either claim 9 or 10 wherein the composition contains between 5 and 20% (wt/wt) of a toxicant which is a chlorinated hydrocarbon or a heterocyclic derivative.
13. A rodenticidal composition according to any one of claims 1 to 12 additionally comprising one or more dye components that absorb in the visible region in the UV region or in both the visible and UV regions of the electromagnetic spectrum.
14. A rodenticidal composition according to claim 13 wherein the dye is a red fluorescing melamine formaldehyde sulphonamide pigment.
15. A rodenticidal composition according to either claim 13 or 14 wherein the dye comprises between 2 and 7% (wt/wt) of the composition.
16. A rodenticidal composition according to claim 15 wherein the dye comprises between 3 and 5% (by wt.) of the composition.
17. A rodenticidal composition according to claim 16 comprising (by wt.) 0.05% brodifacoum, 96.95% emulsified vegetable fat, and 3% melamine formaldehyde sulphonamide pigment.
18. A rodenticidal composition according to claim 16 comprising (by wt) 0.2% difenacoum, 96.8% emulsified vegetable fat and 3% melamine formaldehyde sulphonamide pigment.
19. A rodenticidal composition according to claim 16 comprising (by wt) 0.75% calciferol, 96.25% emulsified vegetable fat and 3% melamine formaldehyde sulphonamide pigment.
20. A rodenticidal composition according to claim 16 comprising (by wt) 10% norbormide, 87% emulsified vegetable fat and 3% melamine formaldehyde sulphonamide pigment.
21. A rodenticidal composition according to claim 16 comprising (by wt) 15% γ -hexachlorocyclohexane, 82% emulsified vegetable fat and 3% melamine formaldehyde sulphonamide pigment.
22. A rodenticidal composition substantially as hereinbefore described with particular reference to the Examples.
23. A method for the control of rodent populations comprising applying a rodenticidal composition according to any one of claims 1 to 22 to the surface of known or suspected rodent run-ways or other areas to which rodents have access.
24. A method according to claim 23 wherein a strip of adhesive tape or similar material is applied, adhesive side down, to the surface and the rodenticidal composition is then applied along the non-adhesive side to the tape.
25. A method for the control of rodent populations substantially as hereinbefore described with particular reference to the Examples.
26. A device for applying a rodenticidal composition according to any one of claims 1 to 22 to the surface of known or suspected rodent runways or other areas to which rodents have access comprising an applicator having a through bore adapted to

- be connected at one end, either directly or indirectly, to a reservoir containing the rodenticidal composition and opening, at the other end, onto a recess of known depth extending to the periphery of the applicator, said recess having side walls which are so arranged that, as the composition leaves the bore and the applicator is moved relative to and in contact with the surface, the composition is applied in the form of a strip.
- 10 27. An applicator according to claim 26 wherein the bore is threaded.
28. An applicator according to either claim 26 or claim 27 wherein the applicator is substantially cylindrical and the bore is in a substantially central position and opens onto the two parallel flat surfaces of the cylinder.
- 15 29. An applicator according to any one of claims 26 to 28 wherein the side walls are substantially parallel.
- 20 30. An applicator according to any one of claims 26 to 29 wherein the recess extends from the bore to the periphery.
31. An applicator suitable for applying a rodenticidal composition according to any one of claims 1 to 22 to the surface of known or suspected rodent runways or other areas to which rodents have access substantially as hereinbefore described with particular reference to the Figure and the Example.
- 25 32. Apparatus for applying a rodenticidal composition according to any one of claims 1 to 22 to the surface of known or suspected rodent runways or other areas to which rodents have access comprising an applicator according to any one of claims 26 to 31 in combination with a reservoir containing a rodenticidal composition according to any one of claims 1 to 22.
- 30 33. A rodenticidal kit comprising an applicator according to any one of claims 26 to 31, a reservoir containing a rodenticidal composition according to any one of claims 1 to 22, and adhesive tape.
- 40